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The Creation of a Multimedia Tutorial Based on the Traditional Model of Communication

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THE CREATION OF A MULTIMEDIA TUTORIAL BASED ON THE TRADITIONAL MODEL OF COMMUNICATION

BY

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ABSTRACT

Computer mediated multimedia learning is playing an increasingly important role in education. This study seeks to create and implement an interactive multimedia tutorial on the process of communication. The tutorial will be based on the traditional basic model of communication used in entry level undergraduate speech communication courses.

The study examines the evolutionary development of the basic model of communication as well as models currently in use in popular textbooks. The study also examines educational theory, visual communication and multimedia learning as they pertain to the creation of the communication tutorial.

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Chapter 1

INTRODUCTION

When the author first started teaching basic speech communication ten years ago he never thought he would find himself advocating the use of computer technology in the classroom. Speech is something to *do*. There are so many great interactive lessons that can be incorporated in and out of the classroom - activities that can actually (not virtually) be participated in. Listening exercises, interviews, group communication exercises, group discussions and a variety of speeches all add to the experiential atmosphere of the speech communication classroom.

The student is actually making speeches in the classroom and witnessing others doing the same. Interviews are conducted and then analyzed for their effectiveness. Group discussions provide constant opportunities for creating awareness about the communication process.

Coming to speech from a theatre background only made the author more wary of getting involved with computer learning. A theatre education is very immediate. It takes place through the study of performance process while in performance. But there are certain theoretical elements of the basic speech course that can benefit from a virtual treatment. "The advent of computer technology has enabled an explosion in the availability of visual ways of presenting material." (Mayer, 2001 p.1) Now that the computer world has

opened up so many innovative possibilities to interact with students, the author was unable to resist.

Presenting a computerized model of communication is the author's current concern. Most universities include some basic speech communication course as a part of an undergraduate liberal arts education. These courses are typically called Public Speaking, Speech Communication, Human Communication, Oral Communication, Interpersonal Communication or Introduction to Communication. Speech courses are often oriented toward public speaking, interpersonal communication or communication theory. Some basic speech courses will include bits of information about all three areas.

Whatever the case they will almost always include a communication model. The major categories of the communication process are broken down and named in order to be thoroughly examined. Along with a verbal explanation it is standard to use some form of graphical illustration or diagram to depict the process in a visual manner. These diagrams are typically made up of circles, squares, triangles, ovals, dotted lines and arrows as well as text, to indicate the various parts of the communication process and its interactions and connections.

In the author's experience, introducing the "process" of communication can be a challenge, especially to a group of bewildered freshmen wondering why they are required to take a communication course at all. It is not uncommon to see the eyes of a student start to glaze over at the mere mention of the words "communication process".

There are, of course, many wonderful descriptions of the process of communication as well as many effective diagrams for visual reinforcement. And eventually the work of discussing and evaluating gets done. But the topic always seems more painful and boring than it has to be.

Current technology offers more effective ways to fight for the imaginations of students. Today's students are barraged by an onslaught of information. An enormous amount of money is spent on findings ways to capture their attention.

> The American Association of Advertising Agencies reports that there are 1,600 commercial messages a day directed at the average individual, that 80 are consciously noticed by the individual, and that 12 provoke some reaction. Apparently we have become skilled in screening out the 1,588 unwanted messages a day and at selecting the desired or unavoidable 12. The mass media, driven by advertising, have the sole purpose of breaking through our defenses against their onslaught. (Kolter, Scheff, 1997, p.304)

When important material is introduced to students it would be nice to be able to compete on the same level as something as mundane as a soda commercial. Today's technological advancements make this possible.

Thesis Project Statement

It is the author's intention to create an interactive, web based, model of communication using computer interaction, animation, graphics, text and sound. The model will be appropriate for entry level, undergraduate students. The model will consist of the most commonly used terminology: sender, receiver, message, channel, context and feedback, and provide an explanation of the major parts of the communication process. This tutorial will be the first module of larger web based tutorial on basic communication principles.

The purpose of the project is to excite, stimulate and help students retain the information. Once the project is completed, the model will be placed online and tested to see how beneficial online, supplemental, material can be in aiding the delivery of the message. Will the interactivity and added audio-visual impact promote and facilitate greater understanding and retention of the material? Will it encourage students to actually use the material?

Subsidiary Questions

Before completing the project certain questions must be explored.

1. What is/are the traditional model/s of the communication process?
2. What is the history of the model?
3. What is its purpose in entry-level undergraduate communication courses?
4. Why are certain models effective?
5. Why might an interactive/animated model be effective?

6. How will it be created and delivered?
7. What aspects of the communication process will it include?
8. How will it benefit comprehension and retention of information?
9. Why is this type of model necessary considering emergent classroom environments?
10. Is it possible to implement such a model in an effective and efficient manner?

Purpose of the Project

Educators are well aware of the need to provide students with a variety of approaches to learning. Also, including technology in the classroom has been seen, by many, as an important means to reaching a new generation of computer-savvy students. This project provides an opportunity to learn more about contemporary students, different styles of learning and how effective web-based, multi-media tutorials can be.

There was a time when information was delivered over the web in much the same way information was delivered on the page, black ink text on a white background. But with enhanced connections and speedy servers, multimedia is finding its way into much more than just banner ads. With the days of text-only pages virtually gone, a new world of opportunity to excite and stimulate the mind of a student is opening up to educators.

The author has decided to find a way to make use of the wonderful new tools of technology that are available. These tools make it possible to take a much more

sophisticated approach to presenting material than is possible with a textbook, chalk board or a Power Point presentation.

Objectives

The objectives are:

- To deliver the information based on compatibility with students' needs, interests and expectations as well as preferred modes of interaction.
- To make the information accessible.
- To deliver the information with the greatest impact.

Communication Terms Defined

Process: Communication is constantly evolving. It is not static. It cannot be studied in the same manner that you would study the workings of your mechanical watch which is a constant process. A human being's communication process is not.

System: Communication has a series of interdependent component parts that can be examined and studied.

Linear Communication: (Sometimes known as actional communication) When communication is a one-way process. Feedback is not possible or very difficult. For example: the newspaper, TV, Radio.

Interactional Communication: When there is a give and take between communicators or when feedback is possible. As in: Telephone conversations or instant messaging.

Transactional Communication: Face to face communication or simultaneously interaction through a combination of verbal and non verbal cues.

Sender: An individual engaged in the process of encoding and transmitting messages.

Receiver: An individual who perceives, decodes and assigns meaning.

Message: Signs, symbols, stimuli which are encoded and transmitted, perceived, decoded and assigned meaning.

Verbal Message: Any message conveyed through the use of words.

Non-verbal Message: Messages conveyed through gestures, facial expressions, body positions, as well as vocal intonations (pitch variation, rate and volume changes, pausing, and other vocal cues.) Also, communication conveyed through touch and smell.

Intended Message: Messages we consciously intend to convey

Unintended Message: Messages we unconsciously send through body language, choice of words and tone of voice.

Encode: The process of turning meanings and feelings into commonly understood symbols such as words, vocal intonations, gestures and body positions.

Decode: Creating meaning by interpreting messages.

Meaning: (Sender) that which is intended to be expressed or understood (Macmillan Dictionary) (Receiver) that which is understood by a perceived message

Feedback: The response of the receiver to the sender.

Context: The physical, cultural and relational setting of a communication exchange.

Noise: Disruptions and distortions of a message caused by external, internal or semantic distractions.

Channel: The five senses "The primary channels of interest are the senses of vision and hearing. Most messages that we receive are conveyed through patterns of light and sound, received through the eyes and ears. Touch and smell may also be channels in human communication." (Zimmerman Owen Seibert, 1980, p.10)

Background: The emotional and physical states of the communicators - also, their communication skills, gender, cultural background, the history of the relationship, their expectations, attitudes and memory.

Limitations

The project will not be seeking to redefine the communication process. The project will *not* question or challenge approaches to teaching, nor will it question or challenge theories of the communication process. A version of the description of the communication process will be chosen but its choice will not be argued. That's *not* the focus of the project and is not really necessary since there are a number of accepted and effective descriptions.

The author has researched and analyzed the traditional approaches to teaching the basics of communication theory to make sure the message is clear, appropriate, and effective. The project will not be covering everything about the communication process. The project will *not* be a comprehensive look at all the models of communication from the various disciplines. The project will focus only on the traditional material commonly taught in basic speech communication courses on the undergraduate level.

Creating the first module of this web tutorial is the main focus of this current project. Whether or not it is an effective pedagogical tool will be the subject of further investigation.

Chapter 2

COMMUNICATION MODELS

Before creating an online tutorial based on the traditional communication model, it is helpful to understand what models are, i.e., what the traditional model of communication is, how it evolved, and how it is being treated in current textbooks.

What are models?

Models are used to help clarify complex systems or processes. Models act like a map or design for these processes or systems and aid the student's ability to understand, digest, and retain the material. Models, as stated earlier, break down into component parts. While models can simply be verbal descriptions or analogies, they often include a diagrammatical depiction to graphically display the various parts and relationships within the model. Common models include Maslow's hierarchy of human needs (Figure 2.1) and the food pyramid (Figure 2.2), which breaks down a healthy diet into its component parts.

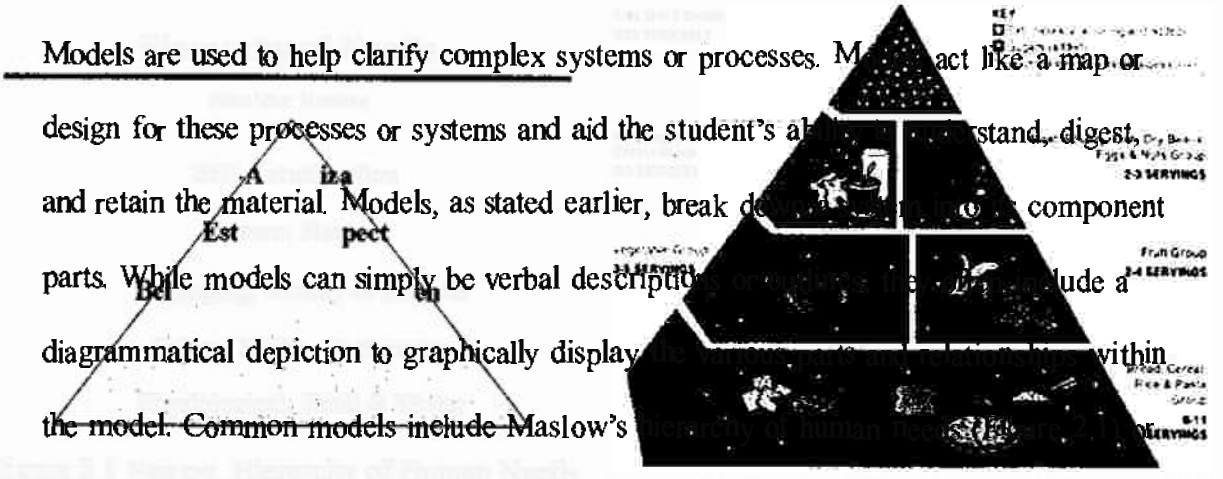


Figure 2.1 Maslow, Hierarchy of Human Needs

Figure 2.2 The Food Guide Pyramid

Communication Model

The goal of the communication model is to present a simplified version of the process, containing only the essential elements. Each essential element must be named and given a place within the system. The model can then be used to discuss the effectiveness of particular communication exchanges, suggest solutions to common problems and provide an overview of the communication process.

Communication models can vary depending upon what type of communication is being studied. Models of communication are commonly used while studying communication, psychology, sociology, management, marketing and public relations, as well as other subjects. Within the field of communication there are many useful models. Some models are more appropriate for mass communication studies or public speaking while others are more appropriate for interpersonal communication.

One common approach for mapping the process of communication is the Sender-Receiver -Message model. Some experts categorize this model as a transmission model because it separates the message from the sender and receiver. The message then must be sent or transmitted. Other elaborations on this model include feedback, encoding and decoding as well as context (or communication environment), channel and noise. This model is effective for introducing the communication process to entry level students of speech communication classes.

Evolution of Communication Models

The evolution of the current models of communication can be traced back to the early Greek and Romans who were mainly interested in persuasion. In his *Rhetoric*, Aristotle breaks down communication into three essential elements:

The speaker (sender)→ The speech (message) → The audience (receiver)

According to Aristotle the speaker had to use the right techniques to form the right message and present it the right way for the right audience in order to get the desired result.

In the early part of the twentieth century, according to Griffin (1997),

> Speech departments offered courses that gave practical advice to those trying to influence audiences.... Teachers drew on a body of wisdom from Greek and Roman times—the writings of Plato, Aristotle, Cicero, and Quintilian were the authoritative sources for instruction in public address. (p.20)

Philosopher I. A. Richards (1936) "proposed a new rhetoric that would be the 'study of misunderstanding and its remedies.'" (Griffin, 1997 p.57) Richards (1946) together with C.K Ogden (1946) created a semantic triangle model (Figure 2.3) to illustrate the difficulties related to meaning, symbols and what the symbols actually refer to.

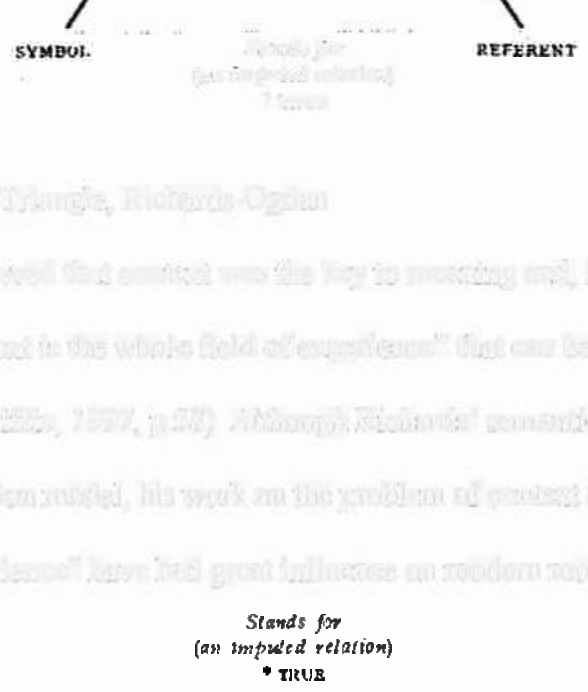
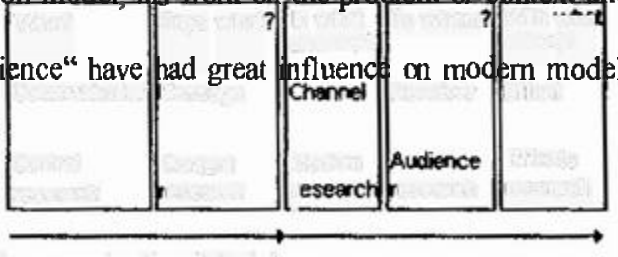


Figure 2.3 Semantic Triangle, Richards-Ogden

Richards (1946) believed that context was the key to meaning and, furthermore, suggested that "context is the whole field of experience" that can be connected to an event. (as cited in Griffin, 1997, p.58) Although Richards' semantic triangle is not a general communication model, his work on the problem of context and meaning, and his term "Field of Experience" have had great influence on modern models of communication.



In the 1940's sociologist Harold Lasswell, who studied mass media, public opinion, politics and propaganda, created his model - Who? Says what? In what channel? To whom? With what effect? – (Figure 2.4) to look more specifically at the problems of Mass Communication.

Who?	Says what	In what channel?	To whom	With what effect?
Communicator	Message		Receiver	Effect
Control research	Content esearch	Medium r	esearch	Effects research

Figure 2.4 Laswell Communication Model

Lasswell's model, like Aristotle's, is considered to be linear in nature. The main focus is on one-way communication. Later models give greater attention to the interactive nature of communication - the give and take between participants. Still other models focus on transactional exchanges, that is, simultaneous effects on participants in a given exchange.

Lasswell's model contains important fundamentals still used in mass media research. It remains an excellent model for any category of communication being studied.

In 1948 Claude Shannon presented a Paper called *The Mathematical Theory of Communication* which included a linear model of communication. This paper was published in 1949 along with a commentary by Warren Weaver. The model is now referred to as the Shannon-Weaver Model (Figure 2.5).

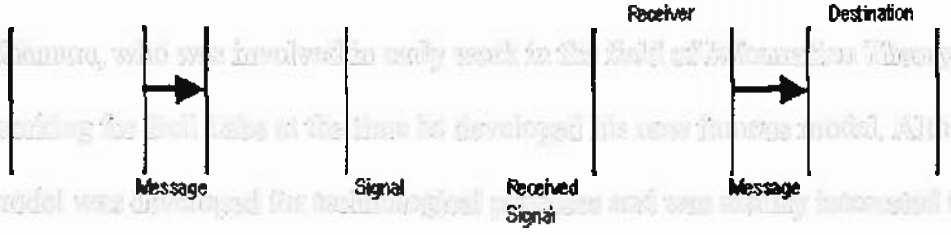


Figure 2.5 Shannon-Weaver Model

Shannon, who was involved in early work in the field of Information Theory, was working for Bell Labs at the time he developed his now famous model. Although the model was developed for technological purposes and was mainly interested in the transfer of information not meaning, it has had a major impact on the models used in most entry

level communication courses. The model was general enough to allow it to be applied to a number of communication contexts, making it suitable to introductory work.

Although the terms encoding, decoding and channel are not present in the actual model, these were key concepts Shannon was considering in his theory and were mentioned frequently throughout the paper. Weaver (1949), in his commentary, argued that the model could be applied to human communication. The "information source" becomes a person (sender) sending a "message" that must be encoded (verbal and non verbal symbols) and "transmitted" (speech or action). The "signal" (encoded message transmitted through sound or light waves) travels through a "channel" (the senses). Noise is interference that can distort the message either in the mind of the source/destination, during transmission, in the environment while the message is signal or in the process of reception.

During the discussion Weaver (1949) uses the terms Sender and Receiver in place of Source/Destination. Weaver (1949) also believed Shannon's theories could be "adapted to handle one of the most significant but difficult aspects of meaning, namely context." (p. 117)

Although Weaver's (1949) contention that the model could be used for human communication was challenged by many, his argument set in place many of the terms used in modern models of communication. The Shannon-Weaver Model is still

commonly discussed and often recreated in modern textbooks. And, although it's often criticized, the terminology is still widely used.

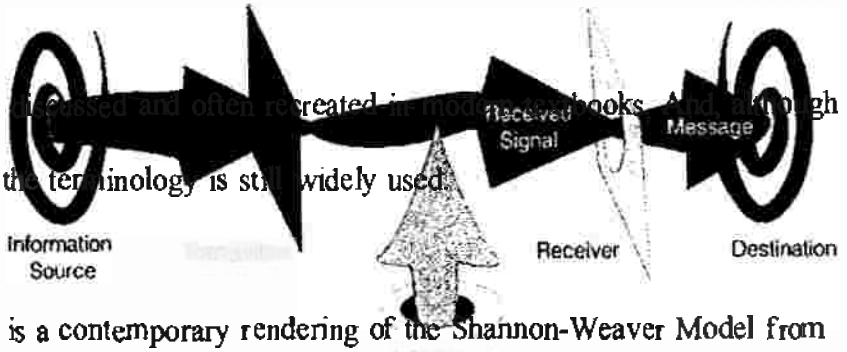


Figure 2.6 is a contemporary rendering of the Shannon-Weaver Model from *Communication in Our Lives* (Wood, 2000)

Figure 2.6 Textbook recreation of Shannon-Weaver Model

Wilbur Schramm (1954) who, like Lasswell, was interested in Mass Communication, adapted many of the key concepts of the Shannon-Weaver model to fit within a communication studies context. Schramm (1954) was instrumental in developing communication as a field of study within the University.

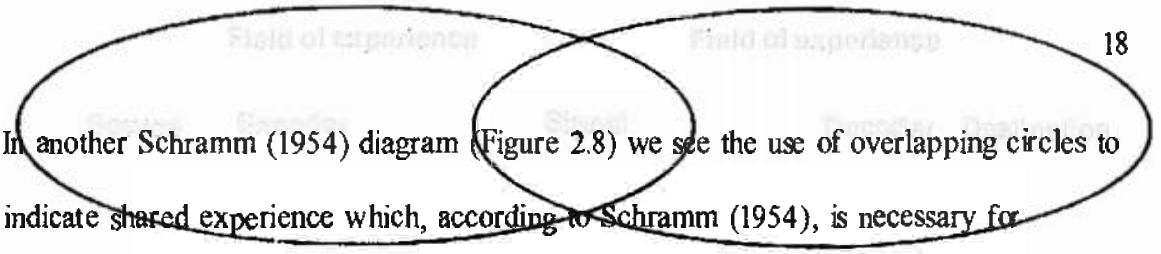
Schramm (1954) uses some of Shannon's basic terminology in his models and descriptions but he makes the point that in human communication each person is both encoder and decoder. He also uses the concept of feedback which was developed by Shannon's colleague Norbert Wiener who was working in the field of Cybernetics.

"Feedback" according to Schramm (1954), "plays a very important part in communication because it tells us how our messages are being interpreted." (p.9) Along with the terms encoder and decoder, Schramm (1954), showing the influence of General Semantics, includes the term Interpreter to indicate that meaning is not in the message but in the message user.

Schramm (1954) used a circle-shaped diagram (Figure 2.7) to illustrate these modifications giving his model an interactive quality rather than linear. This circular design has become an important component of many contemporary models.

Figure 2.7 Schramm Communication Model 1

While Schramm (1954) characterizes feedback as a reaction to the first message sent (interactional communication) he also gives examples of communicators sending and receiving messages simultaneously (transactional communication). Schramm (1954) doesn't actually name it "transaction" but what he describes becomes the foundation for the Transactional Model of Communication which is now used to map the process of interpersonal communication. He also describes communication as a never-ending process. This is a commonly used concept in contemporary, entry level textbooks.



In another Schramm (1954) diagram (Figure 2.8) we see the use of overlapping circles to indicate shared experience which, according to Schramm (1954), is necessary for communication to take place. Schramm (1954) borrows this concept from the field of General Semantics as well. The use of overlapping circles and Richards' (1946) term, Field of Experience, are seen quite often in models today primarily because of Schramm's great influence over the field of Communication Studies.

Figure 2.8 Schramm Communication Model 2

David Berlo (1960), who was a student of Schramm's, created his own communication model (Figure 2.9) known as the SMCR model – source, message, channel, receiver. Berlo suggests that each of the four basic parts of the communication process has five influences.

S	M	C	R
Source	Message	Channel	Receiver
Communication skills	Elements	Seeing	Communication skills
Knowledge	Content	Hearing	Knowledge
Social System	Treatment	Touching	Social System
Culture	Code	Smelling	Culture
Attitudes	Structure	Taste	Attitudes

Figure 2.9 SMCR Communication Model, Berlo (1960)

Berlo elaborates on the key concept of "Fields of Experience" by breaking it down and naming five essential background influences that affect formation, transmission and reception of messages. Also, according to Dalton Kehoe (2001), Berlo

> recognized the influence of the social and cultural systems in which communicators exist. He also points out, like Aristotle, that the message consists not only of content but of the communicator's treatment and coding of that content in order to communicate it effectively.

Berlo, according to Griffin (1997), wrote the leading communication textbook of the 1960's.

Current Trends

Many current textbooks introduce communication models progressively, first as linear, then interactive, and finally transactional. This gives a brief historical look at the evolution of communication models and also shows the effectiveness of different models under different conditions.

Linear communication models (those lacking a feedback loop) are accurate depictions of many important communication exchanges such as reading a book or newspaper, watching a TV commercial or viewing an instructional video.

Interactional models that include the feedback loop but where exchanges take place one at a time, are accurate depictions of exchanges like telephone calls or instant messaging.

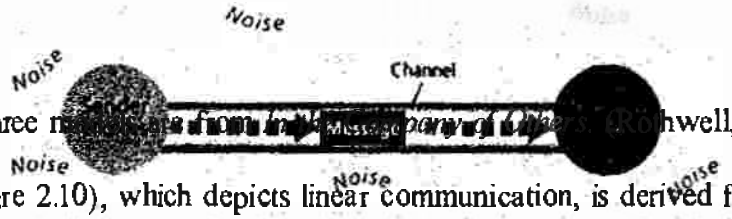
Transactional communication models are more appropriate for describing face-to-face exchanges because messages are sent and received simultaneously. Verbal messages are normally sent one at a time but nonverbal messages can be sent and received at the same time.

Communication is also addressed as a process and a system. We begin our lives interacting with our caretakers and our environment and, as we grow, we build upon these relationships and interactions. Communication then, is an ongoing process that continues to evolve within every interaction we engage in. As a system, communication has a series of interdependent, component parts. Each part is dependent on the next for the whole system to work. If one part breaks down, the whole system will break down.

Context, or Communication Environment, is often included in contemporary models to indicate the influence that the physical environment, culture, and the history of the given relationship, have over the communication exchange.

Sample Diagrammatical Depictions

The following graphical depictions are from various contemporary communication textbooks. Each is effective in its own way. The graphic artists make good use of shape, color and text to give the audience a clear sense of separate components, movement, interconnection and an overview of the communication process. And in each you can clearly see the influence of earlier models.

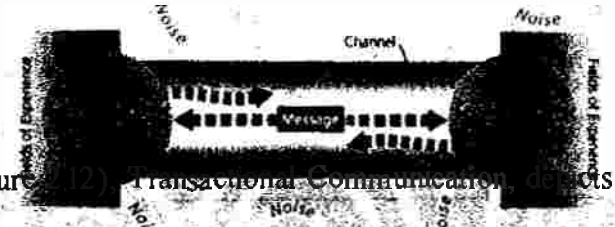


The following three models are from [illegible] (Rothwell, 2000) The first model (Figure 2.10), which depicts linear communication, is derived from the basic concepts of the Shannon-Weaver model. Notice the term Sender is substituted for Source and Receiver replaces Destination as per Weaver's (1948, p.97) description. Shannon's (1948) key concepts of Message, Coding, Noise and Channels are also included. Green represents sending, red represents receiving, and the blue gradient represents the channel.

Figure 2.10 Linear Communication Model

The next model (Figure 2.11), depicting Interactional communication, reflects Schramm's inclusion of "Fields of Experience", a feedback loop and the fact that human communicators are both senders and receivers. Each circle, representing the communicators, has a very clear red and green half to reinforce the concept of interaction. (This model, like most modern models, does not include Schramm's term "Interpreter", avoiding the problem of meaning from General Semantics.)

Figure 2.11 Interactional Communication Model



The final model (Figure 2.12) Transactional Communication, depicts the simultaneous sending and receiving of messages and although it adds two newer concepts, Content and Relationship Dimensions, (Watzlawick, Beavin & Jackson, 1967) it does not depict Schramm's overlapping circles to indicate *shared* Fields of Experience. Green and red have been blurred to indicate transaction.

Figure 2.12 Transactional Communication

The next three models, from *Communicating* (Berko, Wolvin & Wolvin, 1998), also depict the progression from Linear to Transactional communication. But the combination of Shannon's and Schramm's influence manifests itself slightly differently.

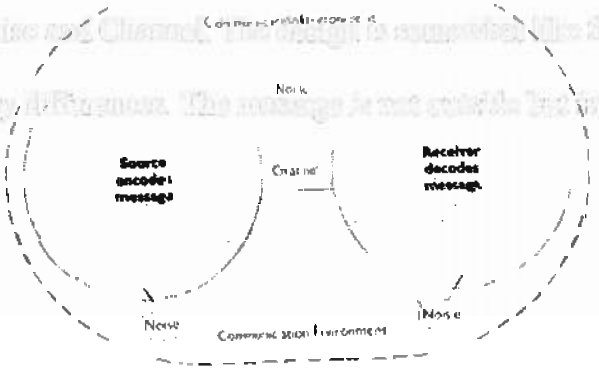


Figure 2.13 Linear Communication

The linear model (Figure 2.13) includes Shannon's terms Source and his concepts of Coding, Message, Noise and Channel. The design is somewhat like Schramm's (1954) but there are some key differences. The message is not outside but inside the

communicator. The source and receiver are joined by the channel and because it is a linear depiction there is no dual encoding /decoding.

Figure 2.14 Interactional Communication

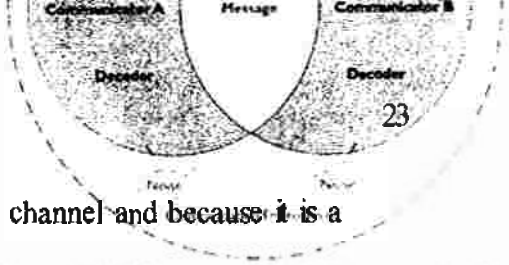


Figure 2.15 Transactional Communication

The Interactional model (Figure 2.14) adds a feedback and adaptation (response to feedback) loop. The transactional model (Figure 2.15), which includes dual encoding/decoding, is reminiscent of Schramm's (1954) overlapping *Fields of Experience* ovals - substituting message for signal in the shared area. That "shared" space is an important part of many contemporary models. It indicates a shared experience (Richards' [1946] influence) that is necessary for communication to take place.

The previous examples show a progression from linear communication to transactional communication. The next model (Figure 2.16), from *Public Speaking* (Grice & Skinner, 1993) is an example of a diagram that was not part of a progression. (The authors included a brief discussion of linear communication and a small linear model but did not include information on transactional communication.)

Figure 2.16 Communication Model

Figure 2.16 is an interactive model and is appropriate to the study of public speaking where the simultaneous sending and receiving of nonverbal messages is not a main focus of discussion.

Similar to Schramm (1954), the model uses two smaller circles with the Shannon-Weaver (1949) terms Encoder/Decoder along with a larger connecting circle with the words message and feedback. The model also uses the Shannon-Weaver (1949) terms Channel and Noise but does not use the terms Sender/Source or Receiver. Instead the model includes the terms Speaker and Listener. Presumably this is to make a more immediate connection with the students who would relate the terms Speaker and Listener to the Public Speaker and the Audience. Grice & Skinner (2001) then use the terms Sender, Source, Encoder, Decoder and Receiver to describe Speaker and Listener in the textual

description of the communication process. The term Environment is used instead of Context.

The lack of an externalized message in some models avoids the discussion of meaning versus message. The absence of the term Transmission in any of the models (although it is used frequently in the textual descriptions of communication) leaves out the problem of vocal production and formation of gestures.

While it is difficult to separate the message from the message senders and receivers, it is also difficult to separate the message from the particular culture from which the message is being exchanged. The message must, in some way, be an agreed upon set of symbols if it is to be used at all. This implies that there are, in some sense, shared meaningful messages outside the message users. Therefore, some models include Communication Environment or Context. The message resides within this shared area instead of using overlapping circles to indicate common experience.

Conclusion

While all the different models are effective in their own way, it is the author's plan to extend the same concepts into the digital realm in order to make maximum use of visual imagery. The tutorial will amalgamate the main concepts seen in most models.

Chapter 3

CREATING AN ONLINE TUTORIAL

The static diagrams presented in the preceding chapter, along with their textual descriptions found in current popular textbooks, are effective tools for exploring the communication process. But they can be greatly enhanced by the use of an interactive, multimedia presentation.

There are good reasons to try this. First, it's a matter of culture. This is how we communicate in contemporary American society. Today's students are used to receiving messages through television, movies, compact discs players and the internet. Television commercials and magazine ads use sophisticated multimedia techniques to get the public's attention and communicate a clear message. Educators can no longer afford to overlook this fact. Media philosophers Taylor and Saarinen (1994) have stated, "Enlightenment no longer automatically sells. Nor does critical thought. To sell your product, you must get down to business and take advertising and marketing seriously."

Also, interactivity is second nature to contemporary students. They have grown up with computers at home and in the classroom. Students are already interacting with the world through computers and multimedia; it only makes sense to bring it into the classroom as effectively as possible. Not only are they ready for this form of interaction, they have the right to expect it.

Second, it should be helpful. The communication model is an abstract concept that is not easily grasped in a short lecture-discussion. Written explanations are effective for a certain number of students, but not for all. It is an ideal subject for an experiment in the effectiveness of computer-mediated, interactive, multimedia tutorials. It is difficult to create a sense of excitement over a description of the communication process. The students can't make a quick connection as to why this information is useful to them, or why they would want to know it. Once they do know the basic information, it is not something they are going to remember easily. So it makes sense to have extra reinforcement online. There, students can review the basics in a format that will help them retain the information more readily.

Finally, it's possible. "Thanks to the evolution of sophisticated technologies and easy-to-use authoring tools, the web has become a key medium for educators." (Bardzell, 2003)

Multimedia and Learning

So, will it be effective? There has been a good deal of research into multimedia learning since the explosion of e-learning in the world of education. Here is a brief introduction to multimedia and its effectiveness in the learning process.

Richard Mayer, a professor of psychology at the University of California at Santa Barbara, has been studying the effects of multimedia learning, as it pertains to his work in cognitive theory and learning, since the early nineties. According to Mayer (2001), the term multimedia means different things to different people. It can refer to a manner of

delivery or it can refer to the equipment with which the material is being presented, like a computer or a projector or a TV. It can refer to the way the message is being formed or represented, like including the use of pictures or graphics along with text and recorded sounds. It can also refer to the way the audience receives the presentation, in other words, through the multiple senses with which the presentation is received.

Mayer (2001) defines multimedia as "any presentation using words and pictures. Words are any material presented in verbal form -- printed text or spoken text. Pictures include static graphics, animations or video." (as cited in Kinnamon, 2003) Mayer has been measuring the effectiveness of the combination of meaningful visual cues in combination with specific language.

Mayer (2001) states that the case for multimedia learning is based on the idea that instructional messages should be designed in light of how the human mind works. Research on mental representations suggests that verbal ways of representing knowledge may be qualitatively different from pictorial ways of representing knowledge. Pavio's (1986) dual-code theory presents the most coherent theoretical and empirical evidence for this idea. (as cited in Mayer, 2001, p. 6) Mayer (2001) believes that visual and auditory experiences are processed through separate and distinct information processing "channels."

Furthermore, education researcher Robert Kozma (1987) states, "The brain stores information in the imaginal mode and in the verbal mode. If information is stored in both

forms, long term retention is facilitated and retrievability is increased." (as cited in Miniutti & Klue 1998) In other words, while language is processed in one part of the brain, visual representations are processed in another. Putting two processing channels of the brain to work at the same time, in a coordinated effort to learn new materials, is more effective than only engaging one. Gombrich has stated that "...the mutual support of language and image facilitates memorizing. The use of two independent channels, as it were, guarantees the ease of reconstruction." (as cited in Miniutti & Klue 1998)

It's possible these theories would include the dual coding of the auditory as well as the visual. In other words, sound effects such as a bird chirping or the sound of a truck driving by can also send messages like the visual use of images. And the combination of sound effects along with words – spoken or written- might have the same dual coding effect.

So far the results of tests measuring the effectiveness of multimedia learning are very promising. Mayer and his colleagues, says Kinnamon (2003), found that students receiving instruction through multimedia presentations not only retained the information better but were able to apply the information to another situation more effectively.

A great example of this, according to Miniutti & Klue (1998), comes from Kathy Beerman. Beerman, an instructor of nutrition, who reported in 1996 that "Students taught with multimedia had significantly higher test scores than students taught without multimedia. Fewer students failed, and students were more likely to receive a higher

grade. On their evaluations, 75% of the students responded 'excellent' to the question 'To what extent does multimedia facilitate learning?'" (as cited in Miniutti & Klue 1998)

Learning Styles

When creating a tutorial of any type learning styles must be taken into account. Many theories of education and learning point to the idea that people learn in various ways depending on the particular make-up of the individual. According to Dunn, "Learning Style is the way in which each learner begins to concentrate on, process, and retain new and difficult information." Learning style is also "...a biologically and developmentally imposed set of personal characteristics that make the same teaching method effective for some students and ineffective for others,..." (Dunn, Beaudry, and Klavas, 1989)

James and Gardner (1995) define learning style as the "complex manner in which, and conditions under which, learners most efficiently and most effectively perceive, process, store, and recall what they are attempting to learn" (as cited in Brown, 1998)

The goal is to create an instructional resource that responds to the diversified strengths or weaknesses of students. The tutorial should be helpful to those students who are more Visual-perceptual as well as those students who suffer from Auditory-perceptual weaknesses (students who have difficulty learning by listening). These students are helped by adding visual clues, key words and illustrations which will be available throughout the tutorial.

In their book *Discover Your Child's Learning Style*, Willis and Hodson (1999) write that:

> "Some people think entirely in pictures... This person translates all types of incoming information into pictures before processing, memorizing or acting on anything. Picture learners learn best from various forms of graphic presentations. These include pictorial charts, and time lines with pictures. Many learners benefit from moving pictures such as movies, CD-ROMs, or live presentations. Video and computers are excellent tools for picture learners." (p. 147-148)

This is precisely the type of learner who is most likely to benefit from the proposed tutorial. Furthermore, the model of communication is an abstract concept defined in language. A diagram can help to organize and clarify the language but mental imagery would be more accurately duplicated in a rich multimedia format rather than a flat, one dimensional, static graphic.

Bardzell (2003) says, "To activate students so that they engage with content better, learningware should contain multimedia interactions..... When you map learning content to the appropriate rich media, you get impressive results." (DevNet)

According to Inspirational Software (2003), a leading provider of visual learning tools,

> Research in both educational theory and cognitive psychology tells us that visual learning is among the very best methods for teaching students. Visual learning techniques - graphical ways of working with ideas and presenting

information- teach students to clarify their thinking, and to process, organize and prioritize new information. Visual diagrams reveal patterns, interrelationships and interdependencies. They also stimulate creative thinking.

And Issing adds, "The psychology of learning has proved that pictorial information can be elaborated and retained much better than text information." (as cited in Miniutti & Klue 1998)

The graphical user interface of computers is a good example of the power of visual communication. The addition of pictorial clues was one of the main factors that led to the proliferation of personal computers.

Plotnick (1997) points out that "visual representation has several advantages":

- Visual symbols are quickly and easily recognized.
- Minimum use of text makes it easy to scan for a word, phrase, or the general idea.
- Visual representation allows for development of a holistic understanding that words alone cannot convey.

The tutorial will eventually be tested (as a further research project) to see if the added visual impact of animation and other graphical elements is effective in engaging students and aiding understanding and retention.

Hermann Witkin's "analytic-global" or hemispheric– right brain left brain – learning preference theory points out a key advantage to the interactive nature of the proposed

tutorial. The analytic-global functions refer to how people process information. Analytic learners prefer a sequential process that leads to an understanding of something whereas global learners like to understand the concept at the outset of learning. Students who are more global prefer to start learning with an overview of the topic to see the point of what they are learning. Analytic students tend to become disoriented by giving too much information at the start and prefer to go one step at a time. In the interactive tutorial students will be able choose either way to work through the lesson, providing an advantageous learning environment for both groups of learners. Interaction will also be helpful because students will be able to work at their own pace.

Macromedia's Flash

This tutorial would not be possible if were not for the innovations of the computer application, Macromedia Flash. Flash can be used to create graphics, animation, and interactivity. Most people are familiar with Flash from having seen fancy introductions to some web sites or annoying pop-up advertisements. Designers have shied away from the introductions (or at least added a "skip intro" option) because they are contrary to the interactive nature of the internet.

Jakob Nielsen, usability guru and founder of Nielsen Norman Group which rates usability issues on the web, has been very critical of Flash. Nielsen noted in his 2000 "Alertbox" that web designer's use of Flash was 99% bad. "Flash tends to degrade websites for three reasons: it encourages design abuse, it breaks with the Web's fundamental interaction principles, and it distracts attention from the site's core value." (Nielson 2000)

However, Nielson (2000) has been employed by Macromedia to help resolve these usability issues in Flash. And, although the use of Flash on the web has improved, the advance of Flash's use in educational tutorials has been astonishing. Some great examples of the use of Flash in learning include:

- Froguts Online Dissection http://www.froguts.com/
- Phonetics Flash Animation Project www.uiowa.edu/~acadtech/phonetics/
- Fertilization www.uchsc.edu/ltc/Fertilization.html
- Remembering Pearl Harbor http://plasma.nationalgeographic.com/pearlharbor/
- 2020 Green http://www.2020green.com/greenst/login/login.jsp

Figure 3.1 Frog Online Dissection

Froguts (Figure 3.1) is a site where anyone can be led through the sequence of a real frog dissection. During the simulation students can click various parts of the frog and anatomy information is provided.

Figure 3.2 Seeing Phonetics

Seeing Phonetics (Figure 3.2) displays animated libraries of the phonetic sounds of Spanish and English. Each consonant and vowel has an articulatory diagram, a description, and video-audio sound clip.

Figure 3.3 Embryology

Embryology (Figure 3.3) is used to teach complex medical concepts to med students. It helps to show structure and sequence. "In this animation, medical students can see the process as well as roll over structures to get more information." (Shank, 2003)

Figure 3.4 Remembering Pearl Harbor

Remembering Pearl Harbor (Figure 3.4) makes great use of Flash to teach about the attack on Pearl Harbor. It includes a time line, interactive map, voice-overs, sound effects and video.

Figure 3.5 2020 Green

2020 Green (Figure 3.5) is a Flash tutorial developed by Second Story Interactive Studios for the Aetna Foundation. *2020 Green* is aimed at teaching students the basic concepts of earning, managing, and investing money. According to the Macromedia Showcase:

> To provide students and their parents with engaging and dynamic experiences, Second Story designers created all the media-rich interactions using Macromedia Flash. "Flash's ability to create an

exciting atmosphere through music, narration, animation, and interactivity is really what brings this project to life," commented Gabe Kean, a designer for Second Story. "Finance is generally a very dry subject, but we were able to make learning those concepts fun by creating a media-rich experience with Flash."

Flash Explained

There was a time (quite recently) when you would have needed a team of designers and technical experts to create a multimedia presentation, and even then it would have been impossible to deliver it over the internet. For a long time "designers craved a better, more efficient way to send graphics over the internet. Macromedia Flash provides that efficiency." (Ulrich, 2001)

What makes Flash such a special web-design tool, and ideal for creating web based tutorials, is its ability to create vector images with streaming capabilities, animation and interactivity. Ulrich (2001) explains:

- **Vector images** Vector images keep file sizes down, and they are scaleable. This means that you can maintain control of what a Web site looks like when your viewer resizes the browser window, for example, making the whole thing stay in proportion as the window grows or shrinks.
- **Streaming capability** Streaming allows some elements to display immediately upon down-load while more information continues to arrive over the Internet.

- **Animation** Flash helps beginners create simple animated graphics, but anyone who is familiar with animation can use Flash's tools to create quite complex animations. Animation in Flash is not limited to cartoon characters like Bugs Bunny and The Simpsons. Flash animations also encompass navigation elements, such as buttons and menus.
- **Interactivity** Flash's scripting language, ActionScript, is easy enough to use that beginners can add simple interactivity controls but powerful enough that serious scripters can create highly sophisticated interactive elements.

Flash makes excellent use of vector graphics. Ulrich (2001) explains that Vector graphics and Bitmap graphics are both mathematical data, but Vector graphics are much smaller in size and much more versatile. You can use either in a Flash movie, but the use of Vector graphics, which can be created right in the flash program, allows for great flexibility and convenience.

The inclusion of vector graphics in a flash movie allows for smaller files that are easily scaled, faster to download and that are visually effective.

Building an online educational module can be complex and time consuming but with Flash you can achieve very sophisticated results without having to be a technician.

Chapter 4

THE COMMUNICATION MODEL

See: http://pirate.shu.edu/~yatesdan/Tutorial.htm

Chapter 5

SUMMARY

Communication models have been, and will continue to be, an integral part of basic speech communication courses. Over 45 popular communication textbooks from the past and the present surveyed by the author included a description and a diagrammatic depiction of the communication process. These models have been influenced by many researchers and theorists from varied fields, but there are some basic consistent elements that remain constant.

Researchers (Mayer 200 l) have found that adding images, animations and sound to a limited amount of text can increase the student's ability to comprehend and retain new material. Programs like Macromedia Flash have made it easier for educators to find innovative ways to deliver material to their students.

Experts (Imagine Software 2003) agree that:

> Visual learning techniques help students clarify thinking. Students see how ideas are connected and realize how information can be grouped or organized. With visual learning, new concepts are more thoroughly and easily understood. For students who express themselves visually, and for those who learn more effectively through the use of visuals, audio, and other multimedia techniques, visual learning inspires higher levels of achievement.

This online tutorial on the process of communication adds another resource for this important subject. Its usefulness and effectiveness will be the subject of further investigation.

Conclusions and Recommendations

Programs like Macromedia Flash and the advancement of the internet and computer technology are changing the landscape of education. Increasing demands are being placed on educators to understand the most effective means of communicating with contemporary students as well as keeping abreast of the latest technological advances.

Online tutorials such as *Pearl Harbor* and *Froguts Online Dissection* are just the beginning of a new approach to delivering material over the internet. If educators are going to compete in today's market they are going to have to take a serious look at the possibilities of multimedia and e-learning.

The interactive tutorial, based on the basic model of communication, will be included in a new project tentatively entitled "Incorporating Technology into COST 1600 – Oral Communication" for the Fall 2003 semester for Seton Hall University. This provides an opportunity for further study of this particular tutorial, visual communication and the effectiveness of multimedia learning.

Once in place for a semester, a survey of the tutorial's effectiveness will be conducted to determine its student value. The survey will include, but is not limited to, the success of visual learning, student ability to comprehend, retain and apply information as well as instructor ease and enhancement. Adjustments will be made to the tutorial based on the results of the initial survey and the trial will be repeated in the Spring semester.

The possibility for future development of the interactive model itself would include more detailed explanations of communication concepts as well as examples of communication situations, problems and solutions.

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